Small-Country Effect within Europe: Liquidity Risk, Small-Firm Effect or Other Factors?

Bachelor's thesis in Finance

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Abstract

This paper studies an anomaly known as the Small-Country Effect, small countries' tendency to produce higher risk-adjusted stock returns than large countries. I use data from 17 European countries from July 1990 through December 2016 and provide a look to the return characteristics of European national stock markets. I compare the compounded average annual returns between European countries grouped in portfolios based on the market capitalization of their national stock markets. I then regress the value-weighted excess return of each country individually on the sample average compounded return and several risk factors associated with liquidity and small-firm-specific risk.

I find no evidence of small countries systematically outperforming large countries in Europe. This result is robust to different risk adjustments. In addition I find the small countries to have worse risk-return characteristics than large countries, contradicting many previous studies on the subject.

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1. Introduction

The equity investment market is becoming ever more competitive as more investors are entering the market globally and robotized trading is increasing the global trading volumes considerably. Existing investment strategies are utilized with increasing volume and thus excess returns are disappearing; it is becoming harder than ever to find underutilized opportunities. Smaller countries could be considered less attractive targets by new investors entering the market, especially in Europe due to many different languages and the associated information asymmetries.

Higher average returns in small countries, even if partly explained by higher than average liquidity risk and volatility, could be valuable especially to large investors with long investment horizons, such as pension funds and large investment banks which have a higher tolerance for such risk due to large capital reserves and well-diversified portfolios. Especially pension institutions and closed-end funds, which do not need to productize their investments and so do not require large scalability, could benefit from specific small-country strategies.

The goal of this study is to research the Small-Country Effect: to find if small (by market capitalization) European national stock markets outperform large ones. This effect has been found by Keppler and Traub (1993), Keppler and Encinosa (2011) and Zaremba and Umutlu (2017) in a global context; though Zaremba and Umutlu find in their 2017 study that the effect has almost disappeared in the last decade. The Small-Country Effect has research supporting it, but very little research has been made in an inter-European context.

Liang and Wei (2012) performed a recent study on liquidity risk's effect on stock returns on a country level and found that local liquidity risk is priced in 11 countries globally. Liang and Wei used Pastor and Stambaugh's (2003) and Amihud's (2002) liquidity measures with data time series from late 1980 until 2005. Like Liang and Wei, I utilize Amihud's measure to explain excess returns but also incorporate two other conceptually different measures of liquidity. I stretch the time series from 1986 to 2016, including the financially turbulent time from 2008 onward and include more European countries. In addition to measuring liquidity, I also include Fama and French's (1983) Small-Minus-Big and High-Minus-Low pricing factors and finally consider possible other explanations for the differences in return profiles.

This study first examines whether small-cap stock markets have produced higher returns than large-cap markets between 1986 and 2016. I then go on to test whether liquidity risk is priced on country level in Europe, whether changes in trading costs explain return reversals and finally if the small-firm effect is more significant in small-cap countries.

This study is laid out as follows: section 2 presents the theoretical background of the Small-Country Effect, the tools used in this study to measure it and the rationale for studying it. Section 3 presents the hypotheses and their foundations. Section 4 presents the data and its properties as well as discusses its limitations. Section 5 presents the empirical test results. Finally, section 6 concludes this study and gives suggestions for further research.

2. Theoretical background

The earliest paper on the Small-Country Effect was written by Keppler and Traub in 1993. They found that investing in national equity markets included in the MSCI Developed Markets index based purely on their size yielded returns significantly above the overall benchmark index from 1975 through mid-1992 (Keppler and Traub 1993). They also found that the small markets had lower downside risk than the MSCI World index. Keppler revisited the Small-Country effect with Encinosa in their 2011 paper with a 40-year time series from 1969 to 2009 (Keppler and Encinosa, 2011) and again found that size had significant predictive power and small countries produced greater risk-adjusted returns, though this effect was not found between 1994 and 1999. This could suggest that the effect is disappearing, which is what Zaremba and Umutlu found in their 2017 study: they took a new stance on researching the size effect by decomposing market capitalization into four components – 12-month momentum, 50-month aggregate return, 60-month equity issuance and 60-month lagged total market capitalization – and confirmed once again a significant size effect starting from 1973. However, all four of their market size-related components proved unprofitable from 2007 to 2017, though lagged market value still displayed significant predictive power.

The researchers speculate that this may be due to improvements in market efficiency and the general disappearance of market anomalies, referring to a 1999 study by Dimson and Marsh. Improved market efficiency may have resulted from the proliferation of exchange-traded funds (ETFs), which make it easy to invest in different countries' equity markets. (Zaremba and Umutlu, 2017). Lessening of information asymmetries might also have contributed to improved market efficiency, especially in Europe where there has been deepening integration and interaction within the European Union.

Dimson and Marsh found already by 1999 that the small firm premium had disappeared from the US and UK equity markets (Dimson and Marsh, 1999). Since the small country effect and small firm premium are related concepts, this could at least partly explain the fading away of the small country effect a few years later.

Liang and Wei's 2012 study on liquidity risk premium across the world divides liquidity risk to local (country-specific) and global pricing factors. They use Pastor and Stambaugh's (2003) and Amihud's (2002) liquidity measures to find that investors are compensated for bearing liquidity risk in 11 developed countries (seven of them included in this study), that global liquidity risk is significantly priced across country portfolios and that countries with better corporate governance and less insider trading carry smaller liquidity risk premiums. In most of the countries that price liquidity only one of the two liquidity measures is priced.

3. Theory and hypotheses

3.1. Theory behind the Small-Country Effect

Several studies have found the Small-Country Effect to exist in many countries worldwide. I investigate whether the anomaly can be said to exist in an inter-European context. Intuitively, small countries producing higher returns is logical because of the widely acknowledged return profile of small stocks; investing in small firms produces higher returns in exchange for greater volatility and possibly even a return premium; a return in excess of the required compensation for additional risk. The Small Firm Premium is an anomaly and anomalies tend to get arbitraged away. However, Europe is a heterogenous area and a home to many small equity markets; there are 14 different languages spoken in the countries in my sample. While many listed companies produce financial statements in English and English is being adopted as the official business language in many companies, utilizing unofficial market information is still more difficult when investors in different countries do not speak the same language. This language barrier should slow down the arbitrage of this anomaly. Another factor is that researching the stock markets in multiple small countries is more work-intensive and offers potentially lower returns on invested time and money than finding an exploitable anomaly in a large market like the US, UK or even Germany or France.

3.2. Hypotheses

My study consists of two steps; First, I calculate capitalization-weighted returns for all the 17 countries in my sample, then perform a multivariate least squares regression analysis of country excess return on the market excess return, three different liquidity-related factors and the three factors of the Fama-French asset pricing model to test if the liquidity-related explaining factors and the Small-Minus-Big factor explain the returns of small countries to a greater degree than the returns of big countries.

I use a more recent time series than other studies that have included European countries, so if the effect is disappearing as some researchers have found, it should be implied by my results.

I test the following hypotheses:

Hypothesis 1: Stocks in small European countries produce higher returns than in large ones.

Hypothesis 2: Returns in small countries are explained by liquidity factors and the small-firm effect.

4. Data and Methodology

4.1. Data

I collected daily data on total return indices, trading volumes, closing prices and number of shares outstanding from every listed stock in 17 European countries, including countries from different cultural and geographical areas within Europe and ranging in size from €40 billion (Greece) to almost €1.900 trillion (Germany).

I sourced the data via Datastream, using Thomson Reuters Worldscope as the source database. The Worldscope database includes delisted stocks and so avoids survivorship bias.

Countries included are: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and Turkey.

4.2. Limitations of Data

Data availability from Datastream was incomplete before approximately 1986. Some countries had data available from as early as 1980, Turkey from as late as August 1989 (with inconsistent data from January) and Luxembourg had an empty gap between January 1987 through December 1988; I could find no explanation for it.

I calculated daily trading volume in currency used in calculating the Amihud (2002) illiquidity factor by multiplying the daily trading volume in shares by the closing price for the stock on the corresponding day; while I acknowledge that this is a rough measure and randomly biased up- and downwards depending on intraday price movement, using intraday price data was outside the scope of this study. Pre-calculated turnover by value data had limited availability from Datastream, being available only for some countries and time periods, so to keep the measures consistent turnover by value was calculated in the same way for every country.

Another isolated issue was that calculating the total market capitalization for Ireland from the Worldscope-supplied data resulted in a value of ~€3060 billion in the end of 2016, far above the approximately €118 euros quoted on the Irish Stock Exchange's 2016 Annual Statistical Report as the year-end 2016 capitalization (Irish Stock Exchange, 2016). I have not been able to find an explanation for this issue; perhaps it is due to some variation in reporting standards, though Thomson Reuters (owner of Datastream and Worldscope) does not mention any different standards for Ireland. Regardless, it is best to take the results for Ireland with a grain of salt. For this reason, the market capitalization for Ireland used for graphs and tables presented is the year-end 2016 value from Irish Stock Exchange's 2016 Annual Statistical Report.

4.3. Data used for analysis

The final regression analysis includes data from July 1990. I calculated another regression model which excludes the Fama-French (1993) SMB and HML factors and starts from January 1986 for the countries with data from that date and from the earliest date with complete data availability for other countries. While especially the liquidity-related factors were significant for more countries in that model, the adjusted coefficient of determination, the R-squared, was much lower (less than 0.15 for most countries) than the adjusted R-squared for the model incorporating the SMB and HML factors (0.584 on average) and the different time series lengths reduce the reliability of the analysis for country comparison. Perhaps it could be inferred that liquidity was a priced variable earlier and excluding the late 1980s from the model caused their significance to disappear, but the model was not accurate enough to reliably make that conclusion.

4.4. Methodology

From the daily data I calculated a monthly percentage return for every stock in each country and then calculated a capitalization-weighted average monthly return for each country. Market capitalization for each stock was calculated as daily share price times the number of common shares outstanding on the same day and the weight for each stock entering the calculation of the monthly country portfolio return was the average market capitalization in the month.

I used a least squares regression to determine if the factors utilized in this study explain the country portfolio returns;

$$r_{c,t} - rf_t = \beta_{Mkt}(Mkt_t - rf_t) + \beta_{SMB}SMB_t + \beta_{HML}HML_t + \beta_{ILLIQ}LnILLIQ_{t-1} + \beta_{TRNVR}TRNVR_{t-1} + \beta_{Spread}Spread_t + \beta_{Size}LnSize_t + \mathrm{e}_t \qquad (1)$$

Where $r_{c,\,t}$ is the capitalization-weighted average return of country c in month t, Rf_t is the return on one-month US treasury bill in month t, Mkt_t is the equal-weighted average return of the countries in this study in month t (and *not* the market factor calculated by Fama and French), SMB_t is the Fama-French (1993) Small-Minus-Big factor in month t, HML_t is the Fama-French (1993) High-Minus-Low factor in month t, $LnILLIQ_{t\text{-}1}$ is the natural logarithm of the capitalization-weighted average Amihud (2002) illiquidity factor in month t-1, $TRNVR_{t\text{-}1}$ is the capitalization-weighted average percentage share turnover in month t-1, $Spread_t$ is the capitalization-weighted average Roll (1984) bid-ask spread measure in month t, $LnSize_t$ is the natural logarithm of the total market capitalization in month t and e_t is the error term. Adapting Amihud's method, the return for month t is regressed on the *ILLIQ* and *TRNVR* values that are calculated from the previous month and are known to investors when they make their investment decision for month t (Amihud uses annual average values and values calculated from the previous year). Amihud's rationale for using lagged values is that higher illiquidity in one year raises the expected illiquidity for the following year (Amihud, 2002); I adapt Amihud's idea for monthly level. The rest of the factors used are for the same month as the returns being explained: I tested by calculated alternative regressions using similarly lagged values for Spread and the Fama-French three factors as well as regressions calculated with factors with a lag of one year as per Amihud's original method, but their coefficients of determination were lower and p-values higher for almost all countries.

The capitalization-weighted average country excess return is calculated as

$$r_{c,t} - rf_t = \sum_t [r_{s,t} * \left(\frac{Cap_{i,t}}{Cap_{c,t}}\right)] - rf_t \quad (2)$$

where $r_{i,t}$ is the return on stock i during month t, $Cap_{i,t}$ is the average market capitalization of stock i in month t, $Cap_{c,t}$ is the total market capitalization of country c in month t and Rf_t is the one-month US T-bill rate in month t. Even though this study includes only European countries, I used the monthly US treasury bill as the risk-free rate because the commonly used European alternatives, such as German government bond rate are influenced by that country's state of economy and by extension equity returns and could skew the comparison of the countries.

I used Amihud's (2002) illiquidity measure, Roll's (1984) bid-ask-spread and share turnover in percent to measure the effect of country-specific liquidity on returns.
The illiquidity measure developed by Yakov Amihud (2002) measures the impact of one currency unit of trading volume on the stock's absolute daily price change. It is calculated as

$$ILLIQ = \left(\frac{1}{D_t}\right)\frac{|r_{i,y,t}|}{VOLD_{i,y,t}} \quad (3)$$

where D_t is the number of trading days in month t, $r_{i,y,t}$ is the daily absolute return of stock i on day y of month t and $VOLD_{i,y,t}$ is the corresponding daily trading volume of the stock in local currency. "Illiquidity reflects the impact of order flow on price – the discount that a seller concedes or a premium that a buyer pays when executing a market order – that results from adverse selection costs and inventory costs" (Amihud, 2002). For standard-size transactions, the price impact is the bid-ask spread, but larger transaction demand induces a greater impact on prices. The theory is that *ILLIQ* is higher for less liquid (more illiquid) stocks and investors (should) demand a compensation for investing in such stocks. Intuitively, *ILLIQ* should be a priced factor in small countries with low trading volume but no borders to investing in foreign stocks and countries that are vulnerable to unexpected negative shocks to liquidity.

Diverging from Amihud's original method, I calculated monthly average illiquidity factor for each stock. Amihud uses annual averages in his original research; to compensate for the greater monthly volatility as well as to eliminate outliers I winsorized the data by 10 percent, setting the highest and lowest 5 percent of the data points to the upper and lower 95th percentiles, respectively, before calculating capitalization-weighted monthly averages.

The bid-ask spread measure developed by Richard Roll (1984) calculates the implicit bid-ask spread of a stock from the serial covariances of consecutive trading days. Here it is calculated as two times the square root of minus covariance between two consecutive percentage price changes,

$$Spread = \left(\frac{1}{D_t}\right) 2 * \sqrt{-Cov(\Delta P_{i,y,t}, \Delta P_{i,y+1,t})} \qquad (4)$$

where D_t is the number of trading days in month t and $\Delta P_{i,y,t}$ is the percentage price change of stock i between two consecutive trading days y and y-1 in month t: $(P_y - P_{y-1}) / P_{y-1}$.

In his original 1984 study, Roll presents results for spreads calculated from daily returns and weekly returns. In this study I only use the daily measure. This is to avoid model bloating and my decision is supported by the changes in the financial landscape since Roll developed his model in 1984. In Roll's original study using US data from 1963 to 1982, the one-day spread measure returned a mean spread of only 0.298 percent; given the minimum quoted spread of 1/8th of a dollar in the US exchanges at the time, which is 0.3 percent for a stock selling for 41½ dollars, that value is far too low (even though the measure is an estimate of the *effective,* instead of *quoted* spread). The average implicit bid-ask spread estimated from weekly returns was 1.74 percent, which is in a more believable range. He writes that "since the spreads inferred from any observation interval must be equal when the markets are informationally efficient, these results cast doubt on the contention that the New York and American Exchanges really are in fact informationally efficient" (Roll, 1984).

It is commonly accepted that market efficiency has improved considerably since then, as hinted to for example by Dimson and Marsh' (1998) and Zaremba's (2017) studies on the fading of the small firm premium and small country effect, quoted above. In my sample the average effective bid-ask spread across 17 countries from 1986 to 2016 measured from daily returns is 2.8 percent, above Roll's weekly result from 1963 to 1982 but still very feasible given that trading volumes in the US stock exchanges are generally higher than in Europe.

The idea behind Roll's (1984) measure is that in an informationally efficient market the observed market price contains all the available information and a change in price will only occur if new information arrives to the market. However, when transactions are costly to effectuate, a market maker must be compensated; usual compensation includes a bid-ask spread (Roll, 1984). In his original paper Roll found a strong negative correlation between his bid-ask spread measure and the natural logarithm of company size (market capitalization), which is intuitive since trading costs tend to decrease with higher trading volumes. Thus, the Roll measure can be expected to be higher for smaller countries.

As with Amihud's illiquidity measure, I calculated monthly averages from the daily bid-ask spread values, winsorized the data by 10 percent, then calculated a capitalization-weighted monthly average for each country.

The final liquidity-related measure is share turnover. I calculated turnover as daily trading volume in shares divided by the total number of common shares outstanding on the same day,

$$TRNVR = \left(\frac{1}{D}\right)\left(\frac{VOLSHS_{i,y,t}}{NSHRS_{i,y,t}}\right) \qquad (5)$$

where $D_{y,t}$ is the number of trading days in month y of year t and $VOLSHS_{i,y,t}$ is the trading volume in shares of stock i on day y in month t. As before, I calculated monthly average values for each stock, winsorized the values by 10 percent and then calculated a capitalization-weighted average for each country.

I measured the Small-Minus-Big effect using the SMB factor and the High-Minus-Low Book-to-Market Value effect using the HML factor from Fama-French three-factor model. I used the factors provided by Kenneth French on his website. Fama and French construct the SMB and HML factors by first sorting the stocks in a region (Europe in this case) into two groups based on market capitalization and another three groups based in book-to-market equity at the end of each June. Big stocks are classified as those in the top 90 percent of June market cap for the region and small stocks are those in the bottom 10 percent. The book-to-market breakpoints for a region are the 30th and 70th percentiles of book-to-market for the big stocks of the region. They form six value-weight portfolios by sorting stocks in "Small Growth (low B/M)", "Small Neutral" and "Small Value (high B/M)" and "Big Growth", "Big Neutral" and "Big Value".

SMB is the equal-weight average of the returns on the three small stock portfolios minus the equal-weight average of the returns on the three big stock portfolios,

$$SMB = \frac{1}{3}(Small\ Value + Small\ Neutral + Small\ Growth) - \frac{1}{3}(Big\ Value + Big\ Neutral + Big\ Growth) \qquad (6)$$

HML is the equal-weight average of the returns for the two high book-to-market portfolios minus the equal-weight average of the returns for the two low book-to-market portfolios,

$$HML = \frac{1}{2}(Small\ Value + Big\ Value) - (Small\ Growth + Big\ Growth) \qquad (7)$$

SMB factor captures the difference in return premium due to movements in small stocks and HML captures the difference in return premium due to movements in value stocks. (Fama and French, 1993 and French, 2017). The SMB factor should be a statistically significant pricing factor in countries with a high concentration of small firms. The HML factor should be significant in countries with low average market valuation relative to book value.

Finally, I quote adjusted R-squared, or the coefficient of determination, for my regression models as a measure of accuracy (see Table 4 for results for individual countries).

Adjusted R-squared is calculated as

$$R_{adj}^2 = 1 - [\frac{(1-R^2)(n-1)}{n-k-1}], \qquad (8)$$

where n is the number of data points, k is the number of regressors (seven) and $R^2{}_{adj}$ is

$$R^2 = \sum \frac{(y_t - x_{i,t})^2}{(y_t - \bar{\bar{y}})^2}, \qquad (9)$$

where y_i is the excess return in month t and $x_{i,t}$ is explaining variable i in month t.

Table 1. Average correlations between monthly factors entering regression (1).

Average correlation matrix	MKT-RF	SMB	HML	LnILLIQ	TRNVR	Spread	LnSize
Ret-Rf	0.719	-0.117	0.093	-0.011	0.021	-0.123	-0.008
MKT-RF		-0.141	0.124	0.007	0.018	-0.177	0.000
SMB			-0.060	-0.038	0.027	-0.069	0.053
HML				-0.035	0.024	-0.031	-0.006
LnILLIQ					-0.226	-0.196	0.139
TRNVR						0.149	0.185
Spread							0.045

Table 1 displays the average cross-correlations between the factors entering the regression analysis across all 17 countries. The correlations are low across the board and thus each of them should explain a different part of the returns.

The natural logarithm of the illiquidity factor (*LnILLIQ*) and turnover (*TRNVR*) have a strong negative correlation, which supports Amihud's (2002) original research that the illiquidity factor and turnover contain different information on the market liquidity characteristics. Roll's (1984) bid-ask spread measure has a positive correlation with turnover and negative with illiquidity measure, intuitive because spreads tend to narrow when turnover increases. *Spread* also has a noticeable negative correlation with both country- and market-specific returns, with bid-ask spreads widening when stock returns decrease.

5. Results

5.1. Stock Returns in European Countries

Table 2 lists the countries sorted by compounded average annual return from January 1986 (Jan 1987 for Finland and Spain, Jan 1988 for Greece and Portugal and Jan 1989 for Turkey) to December 2016 from highest to lowest.

Table 2.

Country	Geometric average annual return	Average volatility	Market cap 31/12/2016 (Bn€)	Statistically significant measures (p<0,05)	Average ILLIQ	Average effective spread	Keppler ratio
Turkey1)	40,1 %	0,38	169	Mkt-Rf, HML, TRNVR, Spread	0,032	5,33 %	1,04
Sweden1)	16,7 %	0,17	421	Mkt-Rf, LnILLIQ, TRNVR, LnSize	0,002	3,04 %	0,98
Finland	14,7 %	0,25	206,8	Mkt-Rf, HML, LnILLIQ	0,056	3,63 %	0,60
Denmark1)	14,3 %	0,14	297,4	Mkt-Rf	0,018	2,57 %	1,05
France	14,1 %	0,16	1758,4	Mkt-Rf, SMB	0,185	2,92 %	0,91
Ireland2)	13,8 %	0,19	118,3	Mkt-Rf	0,010	2,70 %	0,72
Belgium	12,6 %	0,16	362,8	Mkt-Rf, SMB	0,247	2,38 %	0,81
Average	**12,1 %**	**0,20**	**589,1**	**Mkt-Rf, SMB**	**0,075**	**2,85 %**	**0,65**
Netherlands	11,6 %	0,14	1230,5	Mkt-Rf, SMB, Spread	0,050	2,38 %	0,83
Germany	11,3 %	0,14	1875,2	Mkt-Rf, SMB, HML, Spread	0,177	2,54 %	0,79
Switzerland1	11,0 %	0,13	1269,8	Mkt-Rf, SMB, Spread	0,007	2,22 %	0,85
Austria	10,8 %	0,17	96,6	Mkt-Rf, SMB, HML, LnSize	0,098	2,54 %	0,64
Italy	9,1 %	0,19	701,1	Mkt-Rf, HML	0,009	2,66 %	0,48
Luxembourg	6,9 %	0,27	409,4	Mkt-Rf, SMB	0,042	3,48 %	0,26
Spain	5,5 %	0,13	776,4	Mkt-Rf, HML	0,089	1,50 %	0,44
Norway1)	5,4 %	0,13	226,7	Mkt-Rf, SMB, LnILLIQ, Spread	0,084	1,87 %	0,42
Greece	4,5 %	0,43	40,3	Mkt-Rf, SMB, HML, TRNVR, Spreac	0,084	3,89 %	0,11
Portugal	3,2 %	0,21	55,6	Mkt-Rf, LnILLIQ	0,086	2,75 %	0,15
Notes	*1) Non-eur values exchanged using ECB exchange rate on 30/12/2016.* *2) Market capitalization for Ireland from Irish Stock Exchange Annual Statistical Report 2016 (see Ch4. Data), others calculated as average December 2016 stock price * common shares outstanding in December 2016.*						

Tables 3 and 4 display the countries into three portfolios by market capitalization. The countries entering the small portfolio roughly make up the lower 25th percentile of the total market capitalization of the countries, the medium portfolio makes up the middle 50 percent and the two largest countries form the big portfolio. I have calculated both equal-weight average and value-weight average returns and volatilities for the three portfolios. Table 3 includes all the 17 countries, Table 4 excludes Turkey as a clear outlier.

Table 3.

Small Portfolio	Geometric average annual return	Keppler ratio	Market cap 31/12/2016 (Bn€)
Sweden	16.7 %	0.98	421
Luxembourg	6.9 %	0.26	409
Belgium	12.6 %	0.81	363
Denmark	14.3 %	1.05	297
Norway	5.4 %	0.42	227
Finland	14.7 %	0.60	207
Ireland	13.8 %	0.72	118
Turkey	40.1 %	1.04	169
Austria	10.8 %	0.64	97
Portugal	3.2 %	0.15	56
Greece	4.5 %	0.11	40
Average	**13.0 %**	**0.62**	
Value-weighted average	**13.6 %**	**0.70**	
Total			**2404**
Medium portfolio	**Geometric average annual return**	**Keppler ratio**	**Market cap 31/12/2016 (Bn€)**
Switzerland	11.0 %	0.85	1270
Netherlands	11.6 %	0.83	1230
Spain	5.5 %	0.44	776
Italy	9.1 %	0.48	701
Average	**9.3 %**	**0.65**	
Value-weighted average	**9.8 %**	**0.70**	
Total			**3978**
Big portfolio	**Geometric average annual return**	**Keppler ratio**	**Market cap 31/12/2016 (Bn€)**
France	14.1 %	0.91	1758
Germany	11.3 %	0.79	1875
Average	**12.7 %**	**0.85**	
Value-weighted average	**12.6 %**	**0.85**	
Total			**3634**

Table 4.

Small Portfolio	Geometric average annual return	Keppler ratio	Market cap 31/12/2016 (Bn€)
Sweden	16.7 %	0.98	421
Luxembourg	6.9 %	0.26	409
Belgium	12.6 %	0.81	363
Denmark	14.3 %	1.05	297
Norway	5.4 %	0.42	227
Finland	14.7 %	0.60	207
Ireland	13.8 %	0.72	118
Austria	10.8 %	0.64	97
Portugal	3.2 %	0.15	56
Greece	4.5 %	0.11	40
Average	**10.3 %**	**0.57**	
Value-weighted average	**11.6 %**	**0.67**	
Total			**2235**
Medium portfolio	**Geometric average annual return**	**Keppler ratio**	**Market cap 31/12/2016 (Bn€)**
Switzerland	11.0 %	0.85	1270
Netherlands	11.6 %	0.83	1230
Spain	5.5 %	0.44	776
Italy	9.1 %	0.48	701
Average	**9.3 %**	**0.65**	
Value-weighted average	**9.8 %**	**0.70**	
Total			**3978**
Big portfolio	**Geometric average annual return**	**Keppler ratio**	**Market cap 31/12/2016 (Bn€)**
France	14.1 %	0.91	1758
Germany	11.3 %	0.79	1875
Average	**12.7 %**	**0.85**	
Value-weighted average	**12.6 %**	**0.85**	
Total			**3634**

As can be seen from the tables, small countries are not noticeably outperforming their larger counterparts in Europe. The small portfolio has produced an average return of 13.0 percent compounded annually during the measurement period compared with 12.7 percent for the big portfolio, but the big portfolio has a notably higher Keppler ratio (compounded average annual return divided by average annual volatility, closely related to the Sharpe ratio but without deducting the risk-free rate) (Keppler and Encinosa, 2011) of 0.85 against the small portfolio's ratio of 0.62 (13.6% and 0.70 against 12.6% and 0.85 for value-weighted averages).

It is worth noting however, that both the highest and lowest performer are in the small portfolio and five out of eleven countries in the small portfolio outperform the equal-weight average return across all portfolios, 12.1%. The small portfolio's average return is also depressed by the low performance of Greece and Portugal, in part attributable to the serious economic troubles undergone by the countries during the 2008 Financial Crisis.

Still, investing in countries based purely on their size following the idea of Keppler and Traub (1993) and Keppler and Encinosa (2011) does not seem to be a good investment strategy within Europe. Removing the clear outlier, Turkey[1], from the comparison makes the results even less convincing for the small portfolio.

The differences in returns cannot be explained by size alone. The correlation coefficient between average return and market capitalization is -0.045 for the full sample and 0.241 for the ex-Turkey sample; the existence of an identifiable Small-Country Effect would imply a significant negative size-to-return correlation (Keppler and Encinosa, 2011).

5.2. Results of regressing excess returns on the Fama-French three factors, liquidity and trading cost factors.

Table 5. Results of the regression analysis (1). Significance levels: 0.1* 0.05** 0.01***

	AUT				BEL				DNK				FIN				FRA				DEU			
Regression results	**Coeff**	**T**	**p-value**	**R^2**	**Coeff**	**T**	**p-value**	**R^2**	**Coeff**	**T**	**p-value**	**R^2**	**Coeff**	**T**	**p-value**	**R^2**	**Coeff**	**T**	**p-value**	**R^2**	**Coeff**	**T**	**p-value**	**R^2**
Mkt-Rf	0.856	18.924	0.000***	0.589	0.770	16.214	0.000***	0.507	0.716	16.716	0.000***	0.511	1.396	19.604	0.000***	0.572	0.912	31.441	0.000***	0.805	0.836	29.258	0.000***	0.774
SMB	0.003	3.380	0.001***		-0.002	-2.463	0.014*		0.001	1.750	0.081*		-0.002	-1.919	0.056*		-0.004	-7.411	0.000***		-0.003	-6.880	0.000***	
HML	0.004	5.049	0.000***		0.001	1.277	0.203		0.000	0.038	0.969		-0.004	-3.595	0.000***		0.000	0.033	0.974		-0.001	-2.390	0.017**	
LnILLIQ	-0.003	-1.333	0.183		0.000	0.322	0.747		0.004	0.974	0.331		-0.017	-2.564	0.011**		0.001	1.382	0.168		0.000	0.083	0.934	
TRNVR	-0.003	-0.837	0.403		0.004	1.492	0.137		0.001	0.247	0.805		-0.002	-0.768	0.443		0.001	0.379	0.705		-0.004	-1.245	0.214	
Spread	-0.002	-0.722	0.471		-0.002	-0.841	0.401		-0.002	-0.981	0.328		0.002	0.765	0.445		-0.002	-1.489	0.137		-0.004	-3.252	0.001***	
LnSize	0.110	2.849	0.005***		-0.028	-0.479	0.632		0.017	0.530	0.597		0.085	1.833	0.068*		0.051	1.330	0.184		0.028	0.768	0.443	

	GRC				IRL				ITA				LUX				NLD				NOR			
Regression results	**Coeff**	**T**	**p-value**	**Adj.**	**Coeff**	**T**	**p-value**	**Adj.**	**Coeff**	**T**	**p-value**	**Adj.**	**Coeff**	**T**	**p-value**	**Adj.**	**Coeff**	**T**	**p-value**	**Adj.**	**Coeff**	**T**	**p-value**	**Adj.**
Mkt-Rf	2.036	15.072	0.000***	0.453	0.902	14.219	0.000***	0.419	1.013	20.234	0.000***	0.590	1.381	17.398	0.000***	0.491	0.830	26.734	0.000***	0.746	0.616	14.940	0.000***	0.431
SMB	0.005	2.321	0.021**		0.000	-0.023	0.982		-0.002	-1.834	0.068*		0.007	4.798	0.000***		-0.003	-5.046	0.000***		0.002	2.725	0.007***	
HML	0.005	2.057	0.041**		0.001	1.235	0.218		0.002	2.230	0.026**		-0.001	-0.857	0.392		0.000	-1.026	0.306		0.000	-0.728	0.467	
LnILLIQ	-0.004	-0.808	0.420		-0.001	-0.352	0.725		0.002	0.824	0.411		0.000	0.084	0.933		-0.002	-1.104	0.271		0.004	2.186	0.03**	
TRNVR	0.012	2.253	0.025**		0.004	0.766	0.444		0.001	0.555	0.580		0.002	0.586	0.558		0.001	1.065	0.288		0.000	0.174	0.862	
Spread	-0.003	-2.138	0.033**		0.000	0.026	0.979		0.002	0.937	0.349		0.003	1.259	0.209		-0.006	-3.932	0.000***		0.006	5.095	0.000***	
LnSize	0.025	0.442	0.659		-0.012	-0.308	0.759		-0.010	-0.318	0.751		-0.023	-0.941	0.348		0.000	0.008	0.994		0.031	1.532	0.126	

	PRT				ESP				SWE				CHE				TUR			
Regression results	**Coeff**	**T**	**p-value**	**R^2**	**Coeff**	**T**	**p-value**	**R^2**	**Coeff**	**T**	**p-value**	**R^2**	**Coeff**	**T**	**p-value**	**R^2**	**Coeff**	**T**	**p-value**	**R^2**
Mkt-Rf	0.951	14.969	0.000***	0.458	0.584	17.811	0.000***	0.536	0.925	18.783	0.000***	0.539	0.655	19.144	0.000***	0.641	1.533	12.126	0.000***	0.354
SMB	0.000	0.166	0.868		0.000	0.466	0.642		0.000	0.427	0.670		-0.004	-6.410	0.000***		0.001	0.360	0.719	
HML	0.000	0.390	0.696		-0.001	-2.844	0.005***		0.000	-0.400	0.689		0.000	0.916	0.361		-0.004	-1.948	0.052	
LnILLIQ	-0.006	-2.101	0.036**		-0.002	-1.354	0.177		-0.010	-4.600	0.000***		-0.002	-0.431	0.667		0.004	0.494	0.621	
TRNVR	0.004	1.173	0.242		0.001	1.637	0.103		0.001	2.019	0.044**		0.000	-0.016	0.988		-0.010	-2.670	0.008***	
Spread	-0.004	-1.336	0.182		-0.002	-1.117	0.265		0.002	0.996	0.320		-0.007	-3.357	0.001***		0.011	3.738	0.000***	
LnSize	0.070	1.042	0.298		0.017	0.931	0.352		-0.060	-2.050	0.041**		0.010	0.242	0.809		0.031	1.236	0.217	

Table 5 displays the results of my regression analysis. Under each country, column one displays the coefficients for each factor, column two displays the T-statistic, column three displays the respective p-value and column four displays the adjusted R-squared for the regression model.

Unsurprisingly, the coefficient between the excess return for the analyzed country and the equal-weighted average excess return across all countries (known as Beta) is high and statistically significant at 0.01 level for all the countries. It is notable that the two direct liquidity measures used, *ILLIQ* and *TRNVR* are, with the exception of Sweden, not significant at the same time for any country. The most commonly priced factor is the Small-Minus-Big (*SMB*) factor, being significant in 12 out of 17 countries. The natural logarithm of market size (*LnSize*) tends to have the highest coefficients outside of Beta for most countries, positive or negative, though its effect is statistically significant only for three countries; Austria, Finland and Sweden. At least one of the liquidity-related factors - *ILLIQ*, *TRNVR* or *Spread* - was significant for nine out of 17 countries. *ILLIQ* was significant for four countries (Finland, Norway, Portugal and Sweden), *TRNVR* was significant for three countries (Greece, Sweden and Turkey) and *Spread* was significant for six countries (Germany, Greece, Netherlands, Norway, Switzerland and Turkey). Liang and Wei (2012) found that *ILLIQ* was priced on a statistically significant level in Austria, Denmark, Finland, France, Germany, Ireland and Sweden after controlling for the local market, value and size factors. Even though their methodology significantly differs from mine, some of the differences in findings could possibly be attributed to the different time series, as they use data from 1989 to 2005 and my study uses data from 1990 to 2016; perhaps market efficiency has improved in the 11 years since the 2005.

Liang and Wei (2012) found that stocks with higher sensitivities to unexpected negative shocks to liquidity (captured by *ILLIQ*) earn significantly higher expected returns and they were able to also extend their findings to country level. My model is not able to replicate those findings with the utilized data; *ILLIQ* is statistically significant for Sweden and Finland, which earn second and third highest returns respectively, but also for Portugal and Norway, which are among the worst performers.

General national market-wide liquidity does not seem to be particularly influential factor in explaining stock returns; *TRNVR* is only statistically significant in only three countries and the coefficients are quite low. The correlations between share turnover and both country and market returns are positive though, so increase in trading frequency tends to go with increase in returns.

Of all liquidity-related factors, *Spread*, which measures trading costs, is statistically significant in the greatest number of countries. Predictably it has negative coefficients, so returns decrease when trading costs increase. *Spread* also has very low coefficients, however.

6. Conclusions and suggestions for further research

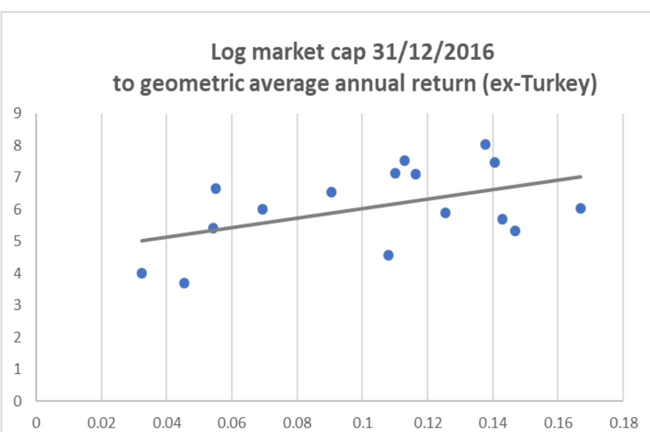
I studied the differences in stock market returns between European countries, specifically concentrating on the differences in return profile between large and small countries. Earlier studies have identified a return anomaly known as the Small-Country Effect, which means that small countries outperform large ones after adjusting for different risk characteristics.

I tested the following hypotheses:

1. Stocks in small European countries produce higher returns than in large ones.
2. Returns in small countries are explained by liquidity factors and the small-firm effect.

6.1. Stocks in small European countries produce higher returns than in large ones

After analyzing the returns, I reject the first hypothesis. The data does not support a general argument that small countries produce higher returns than large ones. The highest performing countries in this study are smaller than the European average, but so are the lowest performers. I formed three portfolios from the countries based on their market capitalization: small, medium and big (see tables 3 and 4). Between July 1990 and December 2016, the small portfolio would have produced the highest returns, followed closely by the big portfolio. However, the small portfolio had much higher average volatility than the big portfolio and the best performer based on Keppler ratio (return divided by volatility) was the big portfolio. The medium portfolio finished last based on both the average return and the Keppler ratio.



As displayed on Graph 1 plotting the natural logarithm of market capitalization on compounded average annual return, the data does not imply correlation between market capitalization and stock returns; there are high and low performers on both sides of the trendline without a clear bias either way.

Graph 1.

6.2. Returns in small countries are explained by liquidity factors and the small-firm effect

The second hypothesis is more difficult to answer. Amihud's illiquidity measure *ILLIQ* is priced on a statistically significant level in Sweden and Finland (second and third highest returns), but not in Denmark and France (numbers four and five) or in any other country with above-average performance. Turnover and Spread are likewise only statistically significant in some of the countries.

The average adjusted coefficient of determination, R-squared, of my regression model is 0.548 across the 17 countries (see formulas 6 and 7). That means my regression model explains just over half of the variation in returns, on average. Based on that and the fact that both the factor explaining the small-firm effect as well as the factors explaining the liquidity effects were significant for some but not all of both the high and low performers and both big and small countries, nothing conclusive can be determined with regards to hypothesis number two. There are many other possible risk factors that may explain the returns with a better coefficient of determination, some of those possibly related to (il)liquidity.

Although it is not possible to make a conclusion with regards to my second hypothesis, this study regardless contributes to the existing research by determining some statistically significant pricing factors for European countries, as well as compiling and comparing the returns of the countries.

6.3. Suggestions for future research

More research is called for to better explain the return profiles for different European countries. This study only explores some possible sources for differences in returns. My model could be further refined by eliminating the limitations with regards to some roughly calculated measures and the data anomaly mentioned in Chapter four. It would also be useful to model the country-level average returns on Europe-level average pricing factors, in addition to the local factors used here.

Further research could be done into measures related to investor home bias and/or information asymmetry between countries. As I theorized in chapter three, the language barriers within

Europe could feasibly form a source of information asymmetry, contributing to home and native language area bias in investment decision making. Perhaps a model incorporating data on European investor holdings could be developed to explain some of the returns.

One interesting research direction would be attempting to construct additional country or area-specific models for measuring risk, following Zaremba (2016), who uses the Economist Intelligence Unit Indicators as a proxy for country risk.

Another future area of research worth exploring would be a wider study of how the mandatory adoption of IFRS reporting standards in the EU in 2005 has affected the efficiency of the European capital markets. Armstrong et al. (2010) found incrementally positive investor reactions to 16 events associated with the adoption of the IFRS standards in Europe, especially for companies with lower quality pre-adoption information and higher pre-adoption information asymmetry, consistent with investors expecting net convergence benefits from adoption of the new standards. A finance-oriented study could be performed to find out if the expected benefits have materialized and if the EU is moving towards economic convergence.

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